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**ЕКОНОМІКА ТА УПРАВЛІННЯ НАЦІОНАЛЬНИМ ГОСПОДАРСТВОМ**

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**ECONOMIC SPHERES OF THE GLOBAL BIOFUELS MARKET**

**Abstract.** *This article deals with the features of formation and prospects of the global biofuels market in the present conditions of deepening world economic problems. It was established that the potential for renewable energy is necessary to provide gradual policy for energy efficiency and renewable energy that will create a more favorable investment climate in the industry and thus will contribute to its intensive development.*

**Keywords:** *the global biofuels market; renewable energy; energy security; bioenergy.*

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**ЕКОНОМІЧНІ ПЛОЩИНИ РОЗВИТКУ СВІТОВОГО РИНКУ БІОПАЛИВА**

**Анотація.** *В статті розглянуто особливості формування та перспективи розвитку світового ринку біопалива в сучасних умовах поглиблення проблем світової економіки. Встановлено, що для реалізації потенціалу відновлюваної енергетики в повній мірі необхідна послідовна політика в галузі енергозбереження та використання поновлюваних джерел енергії, яка дозволить створити більш сприятливий інвестиційний клімат в галузі і, таким чином, сприятиме її інтенсивному розвитку.*

**Ключові слова:** *світовий ринок біопалива; відновлювана енергетика; енергетична безпека; біоенергетика.*

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**ЭКОНОМИЧЕСКИЕ ПЛОСКОСТИ РАЗВИТИЯ МИРОВОГО РЫНКА БИОТОПЛИВА**

**Аннотация.** *В статье рассмотрены особенности формирования и перспективы развития мирового рынка биотоплива в современных условиях углубления проблем мировой экономики. Установлено, что для реализации потенциала возобновляемой энергетики в полной мере необходима последовательная политика в области энергосбережения и использования возобновляемых источников энергии, что позволит создать более благоприятный инвестиционный климат в отрасли и, таким образом, способствовать ее интенсивному развитию.*

**Ключевые слова:** *мировой рынок биотоплива; возобновляемая энергетика; энергетическая безопасность; биоэнергетика.*

**Urgency of the research.** The problems of energy efficiency, the introduction of energy-saving technologies and the search for renewable energy sources are of increased attention of the international scientific community. Renewable energy in the world is growing rapidly, on the one hand, due to the limited geological reserves of the main types of fuel resources - oil and gas, leading to an inevitable increase in their prices, and on the other hand - with increasing negative impact of environmental factors effects caused by human activities. Thus, the growing needs of the world in fuel, electric and heat energy, along with ensuring environmental safety, necessitate the development of renewable energy.

**Target setting.** Biofuels hold a special place in the structure of renewable energy, because they are an important resource for diversification of energy sources and energy security. In this regard, the

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beginning of the XXI century was a period of active formation and development of the biofuels market, which is laid in the future energy system model of the world. However, the formation of modern trends in the global biofuels market is accompanied by a number of conflicts, and economic, environmental and social effects of the introduction of biofuels are the subject of scientific debate. These factors can be a significant impediment to the development of the biofuels market and, therefore, require a more detailed study of all aspects of the impact of biofuels production, as on the economy of individual countries as on the world in general.

**Actual scientific researches and issues analysis.** In recent years, under the influence of the growing integration in the field of renewable energy there are different aspects of problems of biomass as an energy source which have been the subject of a number of scientific researches. Thus, the focus of the Ukrainian and foreign economic literature is set on technical and ecological problems of technological development, production and use of biofuels, the global assessment of the potential of bioenergy, biofuels market analysis of individual countries.

**Uninvestigated parts of general matters defining.** Today a lot of material on the formation and characteristics of the world biofuels market remains unexplored. Therefore, the lack of scientific degree of the formation and development of the global biofuels market problem as well as the practical importance of studying these issues for Ukrainian economy made the authors interested in this topic.

**The research objective.** The article aims to study the characteristics of the formation and development prospects of the global biofuels market in the present conditions of deepening global problems of the world economy.

**The statement of basic materials.** Currently, the demand for biofuels outnumbers the supply greatly, which is the most effective market incentive for the industry, despite the food component of bioenergy issues.

The basis of the continued growth of the complex demand for biofuels includes mainly such factors as the population growth, continuous increase in the world energy needs, both in electricity and in the transport sector, limitations and exhaustion of traditional energy sources and their high prices. In this situation, the energy saving is seen as a source of traditional energy resources by replacing them in the overall balance of consumers, local energy supply facilities and consumers in remote and inaccessible areas outside the networks of centralized power and the competitive replacement of conventional sources in some sectors.

Exploring the dynamics of the global biofuels market, it can be noted that consumption and trade of biofuels were mainly local in nature before the period of sharp price increases for energy production, but now it is the global turnover of the product. The main reasons for increasing in biofuels production turnover are increasing import needs in a number of industrialized countries, mainly the USA and EU, which are most actively implementing ecological and environmental policies tasks to reduce greenhouse gas emissions, but do not have a sufficient number of bioresources for production in the country. Rapid bioenergy development within state programs for biofuels use has transformed these countries on the one hand, into the catalysts of trade, and on the other - into one of the largest consumers in the market.

The sustainable growing consumer demand in this group of countries due to the large range of diversification of biofuels production has an important influence on the dynamics of the world trade in biofuels as a result of the rapid penetration of scientific and technological progress in woodworking and biochemical industries. In this regard, the main feature of the geographical structure of the world trade in biofuels is the dominant part of the industrialized countries, many of which come both exporters and importers.

The competitive position of industrialized countries to export biofuels depend directly on significant capital investments in the development of renewable energy in both public and private companies and the active use of science and technology to use products of the agricultural sector in the production of biofuels. This feature determines the marketed structure of trade in developed countries, where the most important one is deeply processed biofuels technology including the special role of bioethanol and biodiesel.

Developing countries traditionally export raw biomasses which is an important source of foreign ex-

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change supply for their economies. However, the export potential of this group of countries has increased significantly in recent years especially the newly industrialized economies of the world supply of liquid biofuels. The relative excess of cheap labor and the presence of rich natural resources along with favorable climatic conditions for biomass production are the basis of the current competitiveness of most countries of this group.

Brazil, China, India, Thailand, Philippines, Malaysia, and several countries in Africa to south of the Sahara should be noted as the major exporters. However, the analysis of the international trade in biofuels shows that the overwhelming share of imports in the current development of the market rests crucially not on the competitive, technical and economic benefits of the goods, but on the diverse state support [1].

The weakest competitive side of the modern technical bioenergy is production costs because of still imperfect technology conversion of biomass, resulting in cost and efficiency of biofuels production with modern technologies, largely depend on the high cost of raw materials, which takes 50 to 80% of the total cost of the final product for certain types. In this regard, the factors of biofuels feedstock supply are determined by the choice and availability of land resources in the production of liquid biofuels, as well as the availability of organic and wood waste in the manufacture of wood energy - which creates a number of problems and bottlenecks in the further development of biological resources. Bioresources in their current form are often effective only for local, decentralized energy supply and are rarely connected to networks. At the same time, despite the fact that biofuels in general remain more expensive than traditional energy sources, they now appear competitive in some sectors of application by reducing if not the specific energy consumption but its cost (compared with traditional sources). For example, liquid biofuels produced from crops of sugar tropics (for instance, Brazil) are competitive compared to traditional energy sources, which are characterized by high yield per hectare.

The development of biofuels market in most cases is largely determined by a wide range of instruments of state support and market stimulation, especially at the national level. Currently, the state support takes the form of programs of development of biofuels, creating stimulating economic mechanism and application of administrative measures for their implementation in the energy sector.

Almost all developed countries and some developing countries use advanced applications of bioenergy, which provide preferential rules for calculating tariffs for the connection of renewable energy sources to the grid, tax incentives and benefits to consumers and producers of "green" electricity reserving bioenergy cultures areas and land, invention and rationalization support and reduction of administrative barriers. Successful programs crucially depend on the fact that they are based on a detailed economic mechanism, which provides, in turn, budget financing, economic incentives and administrative measures for bioenergy. In the budget sector the government typically takes the cost of invention and rationalization, especially of fundamental research. What about tax and other incentives, reducing excise duties is practiced as well as reduced rates or exemptions for biofuels producers; preferential rates for indirect taxes on the sale of vehicles that run on a mix of traditional motor fuels with biofuels or completely release them from the tax; income tax benefits of conservation programs and other private enterprises. Administrative measures play an important role in the promotion of bioenergy providing for standardization and certification of biofuels standards and quotas for biomass use, energy audit, etc.

The experience of foreign countries shows that the most effective at the national level is a comprehensive approach to regulation that combines administrative and economic instruments aimed to support a guaranteed demand for biofuel products and to stimulate innovation. Almost all countries consider such measures of state regulation as the establishment of mandatory rules on the mixing of liquid biofuels, government procurement, and development of biofuel infrastructure as an important prerequisite for the successful development and use of biofuels.

An effective trade development and adoption of unified international standards of product quality play a significant role in the development of biofuels. The market effect of government regulation appears in smoothing price fluctuations and stabilizing supply and demand, which directly affects the competitiveness of biofuel production.

However, most economic instruments of state regulation that directly affect the profitability and

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competitiveness of biofuels, are often too expensive, considering the still relatively limited role of biofuels in global energy supply, and do not contribute to the development of effective international production structure for biofuels.

The changes taking place in the dynamics and structure of supply and demand for biofuels find their expression in the prices. An important influence on the prices of biofuel production is the average cost per unit of output and its dynamics, which largely depend on the technology of cultivation of agricultural raw materials, yields culture, regional climatic, financial and economic conditions.

The state monetary and financial system has effect significantly on the actual movement of prices of biofuels: fluctuations in market rates of key currencies (dollar and euro). Prices for biofuel production are determined by the ratio of the above factors as well as technological changes and long-term price tendencies for traditional energy. And the state regulation is particularly important in the formation of prices for energy [2].

Thus, the features of the global biofuels market in the medium and long term are largely determined by its position in the global energy and food systems. On the one hand, the process of biofuel production depends on the influence of specific food cycles in the commodity sector and a set of climatic factors shaping the specific market tendencies. On the other hand, one of the most important factors underlying the demand for biofuels is a continuous increase in the world energy needs, resulting in the general economic tendencies in the biofuel market formed under the influence of factors that form the situation of energy markets. The interaction of these factors comes through market mechanisms discrepancy in multiple excess of demand over supply, in disproportionate energy needs of the planet. In these circumstances there is a clear need for objective optimization of the global biofuels market. This possibility of progressive movement in this direction can be achieved largely through the increased efficiency of resources used for biofuel production through the development of the scientific-technological progress [3].

In our opinion, the problem of determining the prospects of the global biofuels market is the need to take into account a complex set of interrelated factors that affect the state of bioenergy development potential and trade in biofuels industries. However, the main limiting factor is not so much the limited resources as the marginal cost of biofuels production and the possibility of more cost-effective ways to reduce greenhouse gas emissions, including a system of carbon capture and storage, alternative forms of renewable energy and energy efficiency and energy savings in manufacturing.

In this situation, in our opinion, the possibility of sustained development of the global biofuels market can be achieved only through fundamental changes in the industry which are determined by the characteristics of scientific and technical progress. The scientific-technological progress effect on the world market in bioenergy sectors will be carried out mainly by supply factors through the development of second generation technologies that provide a broader scope and diversity of feedstock for biofuel production compared to commonly used today first-generation technologies. Thus the main predicted direction of technological progress in the field is biofuel production conversion on non-food raw materials and expansion of waste that are recycled.

The undisputed leader in second-generation biofuels production technology is the USA, which makes it dominant in the market position [4].

In Ukraine, agriculture can be an important element in shaping biofuel market by creating new chains of production for renewable energy. The most effective model of the chain seems agro cluster, which involves the formation of a single complex, including livestock farms, crop farms and processing plants biowaste into electricity, heat and organic fertilizers. To realize the potential of renewable energy in our country it is necessary to provide the consistent state policy on energy efficiency and renewable energy that will create a more favorable investment climate in the industry and thus will contribute to its intensive development [5].

**Conclusions.** Despite the dynamic development of the biofuels industry and the steady growth of demand for renewable energy, biofuels are not able to resolve the full energy shortage in the world yet.

One of the factors hindering the large-scale development of bioenergy is a rather high cost of most biofuels compared to traditional energy. However, the price competitiveness of biofuels varies consid-

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erably, depending on the type of the product, raw materials, the location of production and profitability may change as the world commodity markets change and as a result of technological advances in the same industry.

The direct impact on the competitiveness of biofuels in the markets of some countries has a policy to promote biofuels at the national level while providing financial support and conducting appropriate tax policy.

Despite the fact that liquid biofuels provide only a small share of global energy needs, however, they have a significant impact on global agriculture and agricultural markets due to the use of land resources and raw materials for their production. In the long term, increased demand and rising prices for agricultural products could create opportunities for the development of agriculture and rural areas.

To realize the potential of renewable energy it is necessary to provide gradual policy for energy efficiency and renewable energy, which will create a more favorable investment climate in the industry and thus will contribute to its intensive development.

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